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New Study Seeks to Lower Diabetes Risk in Youth

As schools across the country reopen their doors this fall, hundreds of sixth graders in 42 middle schools will begin taking part in a study sponsored by the National Institutes of Health (NIH). The HEALTHY study will determine if changes in school food services and physical education (PE) classes, along with activities that encourage healthy behaviors, lower risk factors for type 2 diabetes, an increasingly common disease in youth.

“The alarming rise in obesity and type 2 diabetes in all age groups poses a major public health crisis for this country. This important study is one component of a multi-faceted research agenda to address this dual epidemic, which threatens the health of our youth and the vitality of our health care system,” said NIH Director Elias A. Zerhouni, M.D.

Participating schools will be randomly assigned to a program group, which implements the changes, or to a comparison group, which continues to offer food choices and PE programs typically seen in middle schools across the country. Students in the program group will have

- healthier choices from the cafeteria and vending machines (e.g., lower fat foods, more fruits and vegetables, and drinks with no added sugar)
- longer, more intense periods of physical activity, and
- activities and awareness campaigns that promote long-term healthy behaviors.

After 2.5 years, all students will be tested for diabetes risk factors, including blood levels of glucose, insulin, and lipids. They will also be measured for fitness level, blood pressure, height, weight, and waist circumference.

“The school environment can have a profound effect on the behavior and health of young people. From this study we hope to learn if better food options, improvements in physical activity programs, and education about eating better and moving more result in healthier kids and a lower risk of type 2 diabetes,” said study chair Gary Foster, Ph.D., of Temple University.

The study is being conducted by researchers at

- Baylor College of Medicine, Houston, TX
- University of California at Irvine, CA
- University of No rth Carolina at Chapel Hill, NC
- Oregon Health and Science University, Portland, OR
- Temple University, Philadelphia, PA
- University of Pittsburgh Medical Center, Pittsburgh, PA
- University of Texas Health Science Center at San Antonio, TX
- George Washington University, Washington, D.C. (Coordinating Center)

In planning the HEALTHY study, researchers relied on the results of six pilot studies. In one such study, about half of eighth graders in 12 schools were overweight or at risk for overweight. Few had diabetes, but about 41 percent had abnormally high readings of fasting blood glucose, pointing to a much higher risk of developing type 2 diabetes.

Type 2 diabetes is closely linked to being overweight, inactive, and having a family history of diabetes. Nearly two-thirds of U.S. adults are overweight or obese, with a body mass index (BMI) of 25 or more. Among youth 2 to 19 years old, 17 percent are overweight (i.e., have a BMI at the 95th percentile or more for their age and sex) — triple the rate in 1980. About the same percentage of youth have a BMI between the 85th and 95th percentile for their age and sex, putting them at risk for becoming overweight.

Type 1 diabetes, which affects up to 1 million people in the United States, develops when the body's immune system destroys the insulin-producing beta cells of the pancreas. This form of diabetes usually strikes children and young adults, who need several insulin injections a day or an insulin pump to survive. The HEALTHY study is aimed at preventing type 2 diabetes. Other NIH-funded studies are trying to prevent type 1 diabetes in centers nationwide: http://www.nih.gov/news/pr/jun2006/niddk-09.htm.

The longer a person has diabetes, the greater the chances of developing serious damage to the eyes, nerves, heart, kidneys, and blood vessels. “We're already seeing kids in their late teens with early complications from type 2 diabetes,” said Francine Kaufman, M.D., director of the Comprehensive Childhood Diabetes Center at the Childrens Hospital Los Angeles, where type 2 diabetes accounts for more than 20 percent of new childhood diabetes cases. “As a society, we need to address the obesity epidemic if we’re going to have any success containing the rising rate of type 2 diabetes in kids. A logical place to start is in our schools.”

Once seen only in adults, type 2 diabetes has been rising steadily in youth. While there are no national data on the prevalence of type 2 diabetes in youth, clinics around the country are reporting that more young people, especially from minority groups, are developing the disease. Studies in Cincinnati, Los Angeles, San Antonio,

and other cities conclude that cases of type 2 diabetes in youth have risen dramatically since 1994, when less than 5 percent of new childhood diabetes cases were type 2. By 1999, type 2 diabetes accounted for 8 to 45 percent of new childhood diabetes cases, varying by geographic location. Some diabetes centers are now seeing more new cases of type 2 diabetes than type 1.

Nearly 21 million people in the United States — 7 percent of the population — have diabetes, the most common cause of blindness, kidney failure, and amputations in adults and a major cause of heart disease and stroke. Type 2 diabetes accounts for up to 95 percent of all diabetes cases in adults, and about one-third of those affected don't know they have it. The prevalence of type 2 diabetes has risen dramatically in the last 30 years, due mostly to the upsurge in obesity. In addition, at least 54 million U.S. adults age 20 and older have pre-diabetes, which independently raises the risk of developing type 2 diabetes and cardiovascular disease.

Results from the HEALTHY study are expected in 2009. Sponsored by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the study is part of a broad research initiative, called STOPP T2D (Studies to Treat or Prevent Pediatric Type 2 Diabetes), which seeks to improve the treatment and prevention of type 2 diabetes in youth. The American Diabetes Association (ADA) co-sponsors the HEALTHY study, and the Institute for Public Health and Water Research supports the study through a grant to the ADA.

The NIH has undertaken a rigorous research agenda to enhance new research in areas of greatest scientific opportunity. [http://www.obesityresearch.nih.gov/About/strategic-plan.htm] The NIH also sponsors *We Can! — Ways to Enhance Children's Activity and Nutrition*, a program to prevent childhood obesity, which encourages parents and children to adopt healthy eating habits, increase physical activity, and reduce leisure "screen time." *We Can!* materials, including fact sheets, brochures and curricula for adults and children, are available at http://wecan.nhlbi.nih.gov or by calling toll-free 1-866-35-WECAN.

The NIDDK, a component of the NIH, conducts and supports research in diabetes and other endocrine and metabolic diseases; digestive diseases, nutrition, and obesity; and kidney, urologic and hematologic diseases. Spanning the full spectrum of medicine and afflicting people of all ages and ethnic groups, these diseases encompass some of the most common, severe, and disabling conditions affecting Americans. For more information about NIDDK and its programs, see www.niddk.nih.gov.

The National Institutes of Health (NIH) — *The Nation's Medical Research Agency* — includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit *www.nih.gov*.